

## DEEP PREPARATION

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### 1. THE MATCH-UP

Chess is a game of concentration, skill, study and psychology. Endless days are spent in preparing for an important match. What opening lines does my opponent favor? What strengths and weaknesses have emerged in his most recent string of victories and rare defeats? What is he likely to play against a Nimzo-Indian? What new wrinkles can we expect to see in his Queen's Gambit Accepted?

But computer chess makes such considerations irrelevant. Right? After all, all computers are programmed to win with superior algorithms – with brute-force computational prowess. Right? Wrong! Computer-chess programs can be and are prepped by their creators to follow certain opening lines. Their opening books are modified, expanded and "tweaked" to give their best shot at emerging from the opening at least even. Then, they are all on their own into the middle and end games. You give your program a better fighting chance by carefully preparing the opening gambits in full (or partial) knowledge of the opponents' published games.

And so it was that a crucial game between Deep Thought and Hitech was the subject of preparation for their inevitable confrontation at ACM's 20<sup>th</sup> North American Computer-Chess Championship in Reno, Nevada on November 12 - 15, 1989.

Deep Thought, the prodigy of Anantharaman, Browne, Campbell, Hsu and Nowatzyk had just made computer-chess history by competing in a two-game match against the World Champion, Garry Kasparov. It also held the title of World Computer-Chess Champion (Edmonton, 1989) and North American Champion (Orlando, 1988). But it was the Kasparov match that had drawn the chess world's attention:

"We're No. 1 (for Now) as Kasparov Beats a Computer,"  
N. Y. Times, October 23, 1989.

"Red chess king quick fries Deep Thought's chips,"  
N. Y. Post, October 23, 1989.

"Back to the Drawing Board. Chess computer's no match  
for animated Kasparov," N. Y. Newsday, October 23, 1989.

(See page 230 for the game scores of the Kasparov - Deep Thought games.)  
So, Deep Thought was seeded first in this year's ACM Championship.

Another powerful contender was Hitech, written by Berliner, Campbell, Ebeling, Goetsch, Gruss and Palay also of Carnegie-Mellon University. Hitech was seeded third, after Cray Blitz, in the tournament.

Professor Hans Berliner was the only participant in Reno who had entered a program (J. Biit) in the first ACM championship in New York in 1970. A computer-chess pioneer, Berliner holds a world correspondence-chess

\* Professor Ben Mittman, former president of the ICCA, was invited by ACM to be an honored guest at the 20<sup>th</sup> North American Computer-Chess Championship in Reno, Nevada. While in Reno he served as a member of the Tournament Appeals Committee with Professors Monty Newborn and Tony Marsland.

championship. And as might be expected, his experience and determination led to an astonishing event in Reno: the third-round match-up between Hitech and Deep Thought.

## 2. THE APPEAL

As those of you who have followed computer chess over the years will recall, controversy is no stranger to ICCA and ACM tournaments. Reno was no exception. After the second round, Hitech and Deep Thought each had two points and each had played Black then White. David Levy, the Tournament Director, had announced that there would be a coin toss to determine the color selection for the third-round Deep Thought - Hitech game.

Before play had begun on the first day, a pre-tournament rules meeting of all the participants was held. One topic of discussion was the question of color determination. It was agreed that scores had priority over previous color assignments in determining colors for an upcoming match. There had also been some consideration of a coin toss under certain circumstances; however, the idea was not supported by the participants.

Prior to the third round, Hans Berliner launched an appeal against the proposed coin toss on the grounds that such an action had been discussed and rejected by the participants. In addition, there are USCF rules that clearly cover the case of tied scores and identical color history, namely that the higher ranking player in the tournament should have its color alternated. In the case at hand, Deep Thought should thus be assigned Black for the third round.

The Appeals Committee (Marsland, Mittman, and Newborn) convened to consider the appeal. They discussed the sense of the pre-tournament meeting among themselves and with other participants. Their finding was to overrule Levy's decision and to hold that Berliner's appeal was valid.

David Levy assigned Black to Deep Thought and acknowledged his apparent misunderstanding of the pre-tournament discussions. On Levy's behalf, it might be pointed out that other participants were also confused about the colors' discussion.

## 3. THE GAME

As the third round began, a murmur of excitement went through the audience – Hitech, as White, was playing Kasparov's sharp opening moves against Deep Thought's selection of the Queen's Gambit Accepted. (See games score with annotations by IGM Larry Evans on pp. 244-245.) Shelby Lyman, one of the Kasparov - Deep Thought match organizers, commented: "History is being made." A computer-chess program was following the World Champion's winning opening sequence against Deep Thought.

It was now clear why Berliner preferred that Hitech play the white pieces. The many years of analysis and experience as a tournament player had taught Berliner the value of careful preparation.

On Deep Thought's side a bug fix was instrumental in avoiding the weaken c6 on move 6, which had led to its quick demise while playing Kasparov. The bug had surfaced again in Deep Thought's first round match with Sun Phoenix, and almost cost Deep Thought that game. A between-rounds correction to a "feature" which discouraged timely castling, meant that Deep Thought's game against Hitech avoided the disastrous c6 move, in favor of Nfd7.

In preparation for this game, Berliner had prepared other lines as well, and after 13 moves from his home analysis, Hitech had a significant advantage in position (see Diagram 1). In addition Hitech had consumed no "thinking" time; Deep Thought showed one hour of time used on its clock.

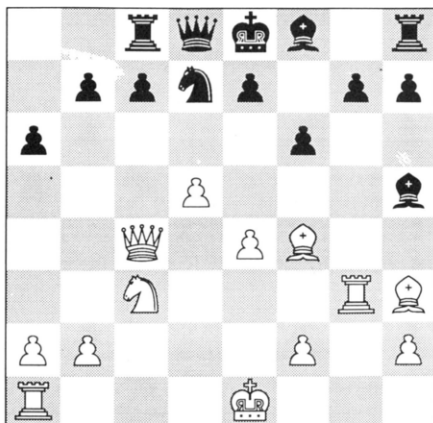


DIAGRAM 1



DIAGRAM 2

The evening progressed as many spectators strolled in from the ACM Supercomputing Conference reception. The Hitech - Deep Thought game drew the attention of a growing audience. Commenting on the game were David Levy, Shelby Lyman, Larry Evans and others. Then suddenly the tables began to turn. On move 19, Hitech's fortunes reversed abruptly as its Queen ended up at h8 (see Diagram 2).

At move 21, as Deep Thought was mounting a devastating counterattack, the audience pondered what Black's next move might be. Applause broke out as Monty Newborn's suggestion for Deep Thought of Qb4 was played on the display board, and the game progressed to a resignation by White on move 31.

Deep preparation had yielded temporary elation for Hans Berliner – but in the end, his only feeling had to be deep disappointment.

#### ACKNOWLEDGEMENT

I would like to acknowledge the help of Monty Newborn and Tony Marsland in preparing this article.

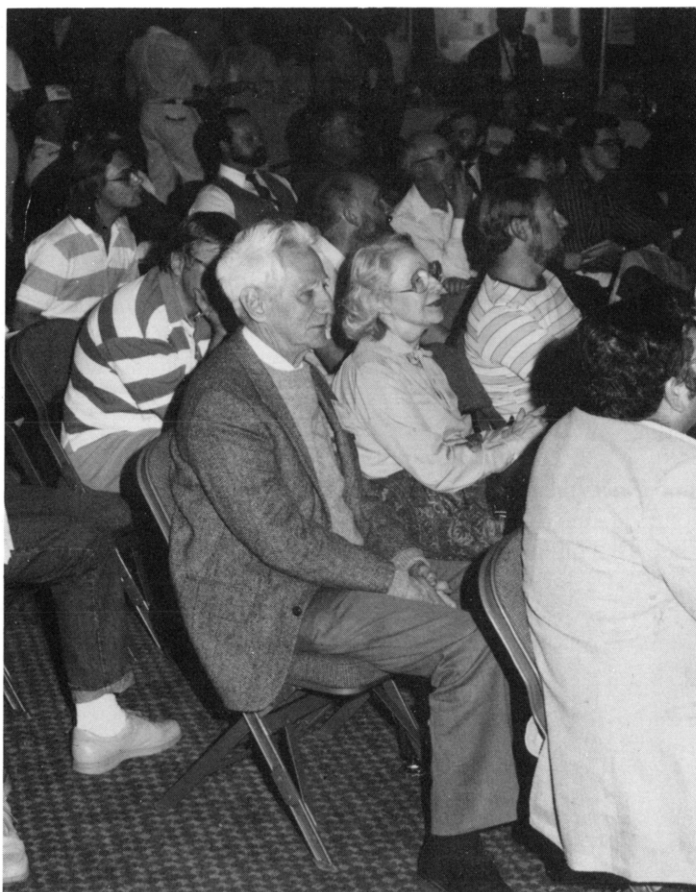


Photo by Jos Uiterwijk.

ATTENTION FOR OTHER PEOPLE'S WORK.  
Mr. and Mrs. Shannon captured by the speaker  
and the photographer. (Edmonton, Alberta, 1989)